

Observations of Comets, 1877 I., II., III., VI., 1880 III., 1882 III., and 1884 III., made at Dun Echt Observatory, with the 15-in. Refracting Telescope.

(Communicated by the Earl of Crawford and Balcarres.)

Comet 1877 I.

Date, 1877.	Dun Echt Mean Time. h m s	$\Delta\alpha$ m s	$\theta-\star$	$\Delta\delta$ "	α h m s	δ ° ' "	Star.	Observer.
Feb. 21	15 12 13.8	+0 52.30		+8 46.7	20 40 50.03	+74 58 2.3	a	R. C.
21	15 48 5.5	+0 13.00		-2 2.1	20 42 39.55	+75 3 17.5	b	R. C.
25	12 54 38.9	+1 41.36		-8 58.3	1 52 25.69	+74 45 36.6	c	R. C.
28	7 56 9.1	+0 2.03		-4 7.8	3 6 9.55	+68 31 13.4	d	R. C.
Mar. 4	9 49 55.1	-0 11.17		+2 48.1	3 45 3.56	+61 35 15.3	e	R. C. 6 meas.
4	10 27 44.9	-0 3.54		+0 42.8	3 45 11.19	+61 33 10.0	e	R. C. 2 meas.
18	10 11 2.8	+0 30.15		+1 19.0	4 23 26.25	+50 31 29.2	f	R. C.
19	11 59 48.3	+0 2.98		+1 43.2	4 25 0.29	+50 3 58.7	g	R. C.

Comet 1877 II.

April 18	15 40 40	+0 2.58		+2 20.5	22 22 5.79	+33 24 34.6	h	J. G. L. and R. C.
19	15 3 49	-0 26.53		+2 20.9	22 23 45.34	+35 8 1.8	i	R. C. 5 meas.
19	15 47 47	-0 23.32		+5 38.3	22 23 48.55	+35 11 19.2	i	J. G. L. 3 meas.
25	12 56 32	-0 14.09		+6 39.2	22 37 31.37	+46 37 57.6	k	J. G. L.
25	13 19 55	-0 10.96		+8 42.6	22 37 34.50	+46 40 1.0	k	R. C.
26	11 57 3	+1 7.23		-0 22.8	22 40 35.38	+48 38 47.2	l	R. C.

Comet 1877 III.									
Date. 1877.	Dun Ficht Mean Time. h m s	$\Delta\alpha$ m s	$\Delta\delta$ ' "	α h m s	δ ° ' "	Star.	Observer.		
April 18	12 2 24	-0 4'53	+5 30'5	1 42 28'36	+57 56 56'3	m	R. C.		
18	12 39 54	+0 11'16	+6 16'9	1 42 44'05	+57 57 42'7	m	J. G. L.		
19	13 36 59	+0 27'47	-4 17'7	1 53 8'53	+58 36 14'4	n	R. C.		
19	13 57 20	+0 36'71	-3 43'0	1 53 17'77	+58 36 49'2	n	J. G. L.		
29	12 24 48	+0 45'98	+4 20'2	3 55 57'09	+61 31 46'9	o	J. G. L.		
Comet 1877 VI.									
Nov. 13	14 26 4	+0 5'87	-0 19'4	6 0 39'84	+15 36 38'3	p	R. C. and J. G. L.		
27	11 52 43	-0 2'43	-3 38'7	4 52 20'64	- 0 6 53'4	q	R. C.		
Comet 1880 III.									
Oct. 6	8 18 56	-3 7'57		16 6 58'48		r	R. C.		
6	8 41 14		-9 58'5		+24 39 51'0	r	R. C.		
19	7 47 18	-1 15'85		17 40 29'93		s	J. G. L.		
19	7 47 50		+0 27'0		+15 5 36'8	s	J. G. L.		
19	7 47 56	-1 43'43		17 40 30'17		t	J. G. L.		
19	7 49 13		+0 38'2		+15 5 30'8	t	J. G. L.		
25	7 19 5	+0 31'58	+7 26'2	18 1 26'18	+12 27 45'7	u	J. G. L.		
Comet 1882 III. (Barnard).									
Sept. 16	15 32 30	+0 18'32	+0 16'5	7 22 54'07	+14 36 4'5	v	J. G. L.		
17	14 44 34	+2 4'58	+1 39'0	7 24 49'50	+13 47 54'5	w	J. G. L.		

Comet 1884 III.

Date. 1884.	Dun Echt Mean Time.	$\Delta\alpha$	$\Delta\delta$	α	δ	Star.	Observer.
Sept. 22	h m s 14 5 46	m s +0 12.51	' '' -1 40.9	h m s 21 16 21.29	' '' +21 26 18.6	α	R. C.
22	15 13 54	+1 21.75	-7 40.3	21 16 22.77	+21 25 0.1	γ	R. C.
24	12 28 27	-1 10.08	+4 18.0	21 17 25.73	+20 33 58.5	ϵ	R. C.
27	11 26 38	+2 37.13	-7 30.0	21 19 23.75	+19 11 31.4	α	R. C.

Observers, Ralph Copeland and J. G. Lohse.

Adopted Mean Places of Comparison Stars.

Star.	α , 1877 ^o .	Red.	δ , 1877 ^o .	Red.	Authority.
a	h m s 20 40 3.87	-6.14	' '' +74 49 27.6	' '' -12.0	2 Dun Echt Merid. Obs.
b	20 42 32.84	-6.29	75 5 31.3	-11.7	1 " "
c	1 50 47.79	-3.46	+74 54 13.2	+21.7	Mean of A.-Ö. 2186, 5 Rad. and Bonn Obs., Vol. VI.
d	3 6 8.30	-0.78	+68 34 57.1	+24.1	Bonn Obs., Vol. VI.
e	3 45 14.59	+0.14	+61 32 4.2	+23.0	4 Dun Echt Merid. Obs.
f	4 22 55.66	+0.44	+50 29 50.9	+19.2	3 " "
g	4 24 56.87	+0.44	+50 1 56.5	+19.0	2 " "
h	22 22 4.09		+33 22 30.4		Lalande 43881, not used.
h	22 22 3.34	-0.13	+33 22 25.1	-11.0	2 resp. 3 Dun Echt Obs.
i	22 24 12.03	-0.16	+35 5 52.0	-11.1	Bessel-Weisse, 22 ^b , 512.
k	22 37 46.16		+46 31 28.1		A.-Ö. 24559, '60, not used.
k	22 37 45.92	-0.46	+46 31 30.1	-11.7	5 Dun Echt Obs. '77-'79.
l	22 39 28.69	-0.54	+48 39 21.9	-11.9	5 " "

Star.	α , 1877 ^o . h m s	Red. s	δ , 1877 ^o . ° ' "	Red. "	Authority.
<i>m</i>	1 42 34.89		+57 51 19.0		A.-Ö. 2031, not used.
<i>m</i>	1 42 34.52	-1.63	+57 51 20.1	+ 5.7	Helsingfors Zones 258 and 261.
<i>n</i>	1 52 42.70	-1.64	+58 40 25.6	+ 6.5	2 Dun Echt Obs.
<i>o</i>	3 55 12.09		+61 27 9.5		A.-Ö. 4396, not used.
<i>o</i>	3 55 12.03	-0.92	+61 27 13.0	+13.7	Helsingfors Zones 299, 547 and 588.
<i>p</i>	6 0 29.32	+4.65	+15 36 48.4	+ 9.3	Bessel-W ₂ V, 1976.*
<i>q</i>	4 52 18.43	+4.64	- 0 3 31.3	+16.6	Gött. Cat. 1401-2.
<i>r</i>	α 1880 ^o . 16 10 4.21	+1.84	δ 1880 ^o . +24 49 47.4	+ 2.1	B.-W ₂ XVI. 274.
<i>s</i>	17 41 43.46	+2.32	+15 5 0.9	+ 8.9	B.-W ₂ XVII. 1309.
<i>t</i>	17 42 11.28	+2.32	+15 4 43.7	+ 8.9	B.-W ₂ XVII. 1327.
<i>u</i>	18 0 52.19	+2.41	+12 20 9.7	+ 9.8	B.-W ₂ XVII. 1266.
<i>v</i>	α 1882 ^o . 7 22 32.99	+2.76	δ 1882 ^o . +14 35 56.0	- 8.0	2 Leipzig Merid. Obs. A. N. 2457.
<i>w</i>	7 22 42.15	+2.77	+13 46 23.3	- 7.8	B.-W. VII. 636.
<i>x</i>	α 1884 ^o . 21 16 5.38	+3.40	δ 1884 ^o . +21 27 29.5	+30.0	2 Dun Echt Obs. 1886.
<i>y</i>	21 14 57.63	+3.39	+21 32 10.4	+30.0	B.-W ₂ XXI. 319.
<i>z</i>	21 18 32.42	+3.39	+20 29 10.4	+30.1	Bonn Obs. VI., +20°, 4902.
<i>a</i>	21 16 43.28	+3.34	+19 18 31.2	+30.2	1 Pegasi, Berl. J. B.

The star *e* = D.M. + 61°, 648, is decidedly red in colour; 1877, March 4.
The star *o* = D.M. + 61°, 667, is of a very deep orange colour; 1877, April 29.

* The star D.M. + 15°, 1076, 9^m.5 does not exist as a single star, although there are several small stars about the place given in the D.M.

Remarks and Descriptions.

COMET 1877 I.

The observations on February 21 were made with a ring micrometer; all the others are derived from measures of position and distance with the filar micrometer. Refraction has been fully taken into account.

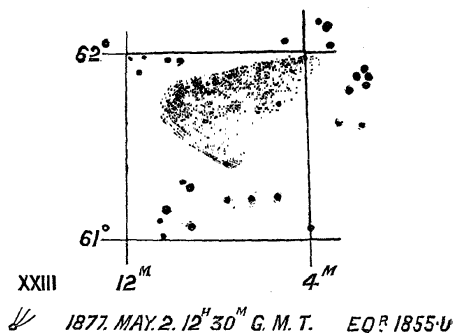
March 4.—The second observation was made to test the effect of the approach to a star on the measures. But eventually, as the central distance became very small, it was impossible to distinguish the relative position of the star and the densest part of the comet. About $10^h 39^m.0$ ($9^h 30^m$ by chronometer) the comet seemed to pass centrally over the star. As usual in similar cases, this estimate differs considerably from the measures, which indicate a central distance of $10''.6$ at that time.

March 19.—Comet very faint; round; $8''.5$ in diameter.

COMET 1877 II.

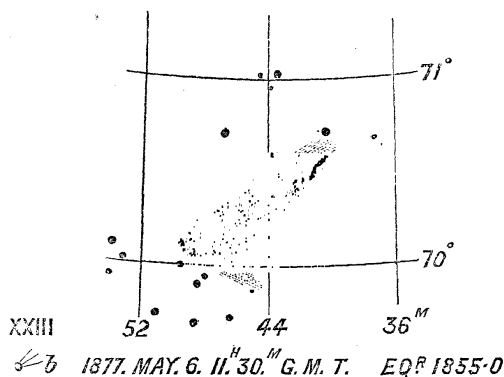
April 11.—The comet has a narrow tail about $18'$ long. The nucleus about as bright as a $6\frac{1}{2}$ mag. star.

April 13.—Tail about $31'$ long, in position 260° .



May 2.—Sketched at $12^h 30^m$, G.M.T. The chief tail was $1\frac{1}{2}$ field, or $56'$ in length. The lateral tail was in position angle about 75° less than the main tail, but the interval was almost completely filled in with nebulosity. The outer edge of the chief tail is very well defined. Examined with power 430 the nucleus is fairly defined as a very small nebula in the midst of the coma, very suddenly exceedingly much brighter in the middle. Aurora and twilight very bright, or doubtless the tail could have been traced farther.

May 6.—Comet sketched at 11^h 30^m, G.M.T.



For spectroscopic observations of comets 1877 II. and III., see *Monthly Notices*, vol. xxxvii. p. 430.

COMET 1877 III.

April 18.—Comet round; much brighter in the middle; 1½' in diameter.

April 29.—Comet round; gradually brighter in the middle; 57'' in diameter.

COMET 1880 III.

1880, October 25.—Tail well visible, as broad as the coma; 15' long in position 62°·6, by two measures. There is no real nucleus, but the central part appears granulated.

COMET 1882 III. (*Barnard*).

1882, Sept. 16. The comet is fairly bright, gradually much brighter in the middle and about 2' in diameter with power 229.

COMET 1884 III.

1884, September 22.—This comet was found at Dun Echt by its spectrum, at 0^h 3^m, sidereal time, with the object-glass prism, on the 6-inch Simms Equatorial. The next morning a telegram was received announcing that it had already been discovered by Herr Wolf, at Heidelberg, on September 17. (See *Ast. Nach.*, Bd. 110, col. 9.) In Dun Echt circular 91, the *time* is wrong.

September 24.—Comet about 3' diam.; elongated towards the *n p* side; nucleus not in the middle.

September 27.—With power 229; diameter in parallel 6^s to 7^s; greatest condensation *n p* the centre.

Observations of Comets d 1885 (Fabry) ; e 1885 (Barnard) ; c 1886 and Brooks I. 1886, made at Sydney Observatory with the 11½-inch Refractor and Polar Micrometer.

(Communicated by H. C. Russell, B.A., Government Astronomer.)

Observations of Comet d, 1885 (Fabry).												
Date.	Sydney M.T.		Star's Name.	Comparison Star's N.P.D.		Comet's diff. from Star. N.P.D.		Comet's Apparent R.A.		Comet's Ap- parent N.P.D.	No. of Comp.	Observer.
	h	m s		R.A.	h m s	R.A.	m s	' "	h m s			
1886.												
May 2	6	48 59	151 Washington 1875	4 22 38.02	88 52 35.3	+0 48.65	0 0'0	4 23 26.67	88 52 35.3	11		H.C.R.
6	8	4 29	Lalande 11334	5 52 32.38	108 4 11.7	-1 29.69	+ 3 40.8	5 51 2.69	108 7 52.5	8		H.C.R.
10	9	7 26	3272 Cape Cat. 1880	6 49 1.25	118 23 28.0	-0 22.20	- 5 36.1	6 48 39.05	118 17 52.0	5		H.C.R.
12	7	48 15	3494	7 9 23.63	120 53 41.8	-1 13.45	+ 6 13.7	7 8 10.18	120 59 55.5	4		H.C.R.
13	7	27 8		7 16 34.34	122 5 22.8	0 0.00	0 0'0	7 16 34.34	122 5 22.8			J.A.P.
14	7	50 44	3715	7 29 6.89	123 9 37.4	-4 43.18	- 2 24.8	7 24 23.71	123 7 12.6	8		H.C.R.
19	7	49 28	3970	7 48 51.78	126 4 29.4	+4 44.75	+ 8 9.9	7 53 36.53	126 12 39.4	10		H.C.R.
20	8	50 6	4076	7 57 54.59	126 44 22.1	+0 12.73	- 5 56.9	7 58 7.32	126 38 25.2	10		H.C.R.
21	7	58 36	4071	7 57 27.11	126 58 26.8	+4 52.58	+ 3 17.1	8 2 19.69	127 1 43.9	10		H.C.R.
22	7	17 40	4147	8 4 26.96	127 21 18.8	+1 40.52	+ 0 47.2	8 6 7.48	127 22 5.9	10		H.C.R.
23	7	59 16	4207	8 8 40.64	127 35 17.1	+1 12.82	+ 6 29.5	8 9 53.46	127 41 46.6	10		J.A.P.
26	9	19 13	4458	8 29 24.62	128 27 57.1	-9 38.90	+ 2 55.9	8 19 45.72	128 30 53.0	3		H.C.R.
26	9	19 13	4354	8 22 6.67	128 41 31.9	-2 20.25	-10 39.9	8 19 46.42	128 30 52.0	3		H.C.R.
30	8	28 28	4482	8 31 0.81	129 35 7.4	-0 29.86	-14 13.8	8 30 30.95	129 20 53.6	10		H.C.R.
30	8	28 28	4482	8 31 0.81	129 35 7.4	-0 30.00	-14 12.5	8 30 30.81	129 20 54.9	7		J.A.P.
31	7	54 46	4482	8 31 0.80	129 35 7.2	+1 52.75	- 3 23.2	8 32 53.55	129 31 44.0	8		H.C.R.
31	7	54 46	4482	8 31 0.80	129 35 7.2	+1 52.27	- 3 21.7	8 32 53.07	129 31 45.5	6		J.A.P.
June 1	8	20 46	4512	8 33 12.36	129 45 26.3	+2 4.45	- 3 6.8	8 35 16.81	129 42 19.5	5		H.C.R.
1	8	20 46	4539	8 36 8.16	129 51 58.9	-0 51.71	- 9 39.1	8 35 16.45	129 42 19.9	6		J.A.P.
2	8	23 18	4539	8 36 8.13	129 51 58.8	+1 24.69	+ 0 29.5	8 37 32.82	129 52 28.3	10		J.A.P.